Turning the museum inside out: The biological sciences at Macquarie University, Sydney, Australia

SARA ESTRADA-AREVALO, VICKI MICHAEL & ANDREW SIMPSON

Abstract

New biological sciences laboratories at Macquarie University have a range of advanced learning technologies to cater for large numbers of undergraduate students. This has provided the opportunity to develop an extended series of integrated exhibition spaces. This distributed model of university exhibition work, effectively turning the museum inside out, has not compromised the role of the fixed exhibition space, or museum, within the biological sciences precinct. Instead it has acted as a catalyst for rethinking student engagement with the museum. A working party was established, including student representation, to map collection content with staff expertise.

This project has enabled the development of an enhanced digital presence for the museum where multiple cross disciplinary narratives are being developed around collection objects. The rationale, process and preliminary outcomes are described in this paper. It represents a useful model of student engagement for a museum with restricted space and financial resources in any academic discipline. The processes generated by this change reinforce the primacy of an object-based pedagogy in tertiary education and more closely align collection content with institutional mission.

Introduction: Biology museum context at Macquarie University

When Macquarie University was established in 1964, the biological sciences were one of the foundation departments. The commencement of teaching prompted the need for the development of teaching collections. The biological collections have developed over the ensuing period, but it has only been in the last two decades that the collection has had a small (approximately 170 square meters) dedicated display space and hence museum (PEARCE & SIMPSON 2010). Situated in building E8A, the Biological Sciences Museum is organized with a conventional layout, the collection exhibited in display cabinets within a centralized location.

The museum utilizes traditional natural history exhibition techniques. It was originally designed in consultation with staff of the Australian Museum, one of the nation's largest and oldest natural history museums. It has a strong design aesthetic with standardized red and green colors intended to be representative of the faunal and floral biological realms. This gives the museum a distinctively different and separate atmosphere from laboratories and other teaching spaces within the biology precinct (PEARCE & SIMPSON 2010).[1]

Anecdotal evidence from discussions with staff indicate that the original museum design and content were closely linked to units of study in the biological sciences at the time, thus fulfilling teaching support as one of the three broad areas of university museum functions alongside research support and community engagement. While all museums strive to produce dynamic and innovative programs often with meager funding and resources, it can be argued that university museums face additional challenges such as low levels of community awareness and even hindrances derived from the department with which they are associated (SOLINGER 1990).

Since 1964, the museum has only received sporadic and inconsistent support in terms of staff and resources from both centralized (university) and departmental avenues. Furthermore, the nature of units of study that are offered in both undergraduate and postgraduate teaching has changed

[1] Pearce and Simpson (2010) provide images of the current displays and a critique of their content.

dramatically in the intervening period, including a reduced emphasis on specimen based instruction and the integration of new technologies and topics with a biomolecular focus of teaching practice.

The museum currently hosts a number (30 to 35) of school groups visits primarily from adjacent geographical areas (PEARCE & SIMPSON 2010). The number of annual external visitors (700 – 1,000) is roughly equivalent to the current undergraduate cohort studying a suite of academic units some of which use the museum's exhibition resources in formal classes. However, many of these units, particularly new units that have commenced subsequent to the museums establishment, don't integrate the museum into formal teaching time.

As a result of this slow disconnection between the museum and the biological teaching programs, the museum became highly vulnerable despite the many pedagogic (and scientific) advantages of an existing discipline specific museum space and associated collection. The university administration and even from some staff members of the host department argued that the museum's space should be deployed for other purposes because of a lack of relevance to perceived academic needs.

Some perspectives on biological collections

Biological and natural history museums have for a long time been the main types of collecting institutions of biological specimens. These collections are many and varied, held either privately or by large institutions, such as universities or government instrumentalities. The collections have provided scientists with valuable information and our fundamental understanding about life on the planet.

They were once seen as the basis of progressive scientific research, but are now perceived by many as boring and uninteresting, lagging behind in a time when technology advances apace. They face an image problem (ALBERCH 1993). Many older collections were donated or bequeathed, had purpose built facilities to house them and, because of their subject matter, were used mainly by those undertaking descriptive taxonomy. The majority of species catalogued in these collections are usually only the focus of attention when another taxonomist seeks to reclassify them. So their value, apart from a cultural understanding how earlier generations of natural historians perceived the natural world, is often questioned.

University biological and natural history collections appear threatened with extinction. Some museums can be accused of behaving like isolated islands, abstaining from being a part of an ever-changing world. This approach means almost certain extinction. Others have been able to think more creatively and carve out new roles and forms of engagement to ensure survival.

Their collections, their greatest asset, remain the basis for improving and promoting their standing among scientific and public communities. Future directions can be established by considering some of the major problems that beset human society today. For these museums biodiversity, education, research and conservation are obvious foci. Museums must leverage their collections by putting them to work to face these challenges head on.

The Convention on Biodiversity came into force on 29th December 1993 (BEATTIE 1995, 3) recognizing the importance of biological diversity and its present and future value. It encapsulates the living part of the world and its vulnerability to exploitation and misuse. Biologists can turn their attention to assessing the damage already done to biodiversity and seeks ways to halt or slow this. Understanding the past is needed to preserve the potential of the future. The collections of natural history museums provide an insight to the past.

The business of natural history museums has been documentation of the diversity of life. The Earth Summit in 1992 indicated this was possibly less than 15% (ALBERCH 1993). Providing access to these collections for anyone interested in our planet's prospects, rather than just a select few, will help more

people gain an insight and an understanding of the human impact on biodiversity. By studying the history, patterns and processes of organisms at all levels of organization from genes to ecosystems and everything in between (KRISHTALKA & HUMPHREY 2000) the museums' challenge is to provide this data now, so it can be utilized for the future.

> "Each specimen is unique and can provide a multi faceted dimension from its locality (spatial), its taxonomy (biodiversity space), and its time (date) – By this we mean 'As collections have aged, the year in which samples were obtained has become increasingly important' " (WINKER 2004).

Raven and Wilson (1992) expressed concern that with the current rate of species loss through extinction, there was only 50 years to solve the biodiversity crisis. Natural history museums need to open up their collections and have them ready to be utilized by researchers and the science community at large. This takes both resources and strategic will and applies equally to university museums and other natural history museums. Collections must be catalogued and made accessible.

Grinnell's idea of the natural history museum as a place where data on the history and distributional ranges of specimens is gathered and maintained has begun to provide much needed information on past life histories of species in decline (GRIESEMER 1990). Winker (2004) says that

> "museum specimens are like the canaries in a coal mine, they are used as a biological filter or samples from experiments in natural environments. Not used for which they were originally collected (i.e. taxonomy), but are now becoming increasingly important for the information they can supply."

Winker (2004) believes that specimens have more value than the scientific papers written about them because in ten years the information will be irrelevant, but the specimen will keep being a source of information because the nature of the questions they can help answer will change.

Cotterill (1995) goes one step further and points out that it is not only the need for conservators to protect the integrity of the specimens but the abilities of biologists to interpret the information correctly and to record this information. He is, of course, talking about the continual "availability of human skills to maintain and study the specimens" as collections grow, systematists and taxonomists are in as much a decline as the specimens themselves. Who will be able to identify new species and record this information if no one is trained to do so? The role of a university natural history museum in training future taxonomists is therefore vital.

Opportunity for change at Macquarie

The opportunity to rethink the nature of the Biological Sciences Museum at Macquarie University came about as a result of the refurbishment of adjacent teaching spaces. In early 2006, staff developed a proposal to introduce a new digital microscopy facility that enabled group work and a biometrics capability. Part of the planning involved the acknowledgement that the museum space was under utilized in teaching programs.

The development of multi-use, multi-role functionality of the new laboratory spaces was intended to allow usage by other departments within the Faculty of Science, not just Biology. Any teaching programs from human evolution, psychology, geology and statistics could take advantage of the new teaching facilities.

Funding was secured for a major rebuild of the teaching space in 2007. One of the design elements included the introduction of double glass walls effectively creating new exhibition space along the length of the laboratories' outer walls. This design created an opportunity, therefore, to develop new displays along the main buildings of the biology precinct that could utilize specimens from a range of scientific disciplines. There was strong debate within the biology department about the future of the

fixed display space, i.e. the original museum. Some argued that it should be converted to other uses such as a staff tearoom.

Fortunately, there was a more compelling opportunity to link the museum and its collections with the new teaching spaces. A Biology Museum Advisory Group (BMAG) was formed with membership including biological sciences department academic and general staff, museum studies staff and postgraduate and undergraduate students. Their task was to reconceptualize the museum in terms of the new teaching laboratory development, and modern imperatives for usefully deploying the department's natural history collection.

Reconceptualizing the museum

BMAG has recognized that researchers can not only be valuable to science but they can connect with the community outside the university allowing the general public to see just what sort of research goes on in a higher education institution. Although the museum had been side lined in budget cuts for a number of years, a change in its exhibition potential has been enabled through the involvement of the university's museum studies program.

The original theme of the museum had been *Evolution, Biodiversity and Conservation* but the displays in the cabinets had ceased to be maintained and what information there was had not been kept up to date. After consultations with the Australian Museum (the major natural history institution in the state of New South Wales) it was decided that the university's biological sciences' staff could provide a unique focus and research quality for the museum's redesign.

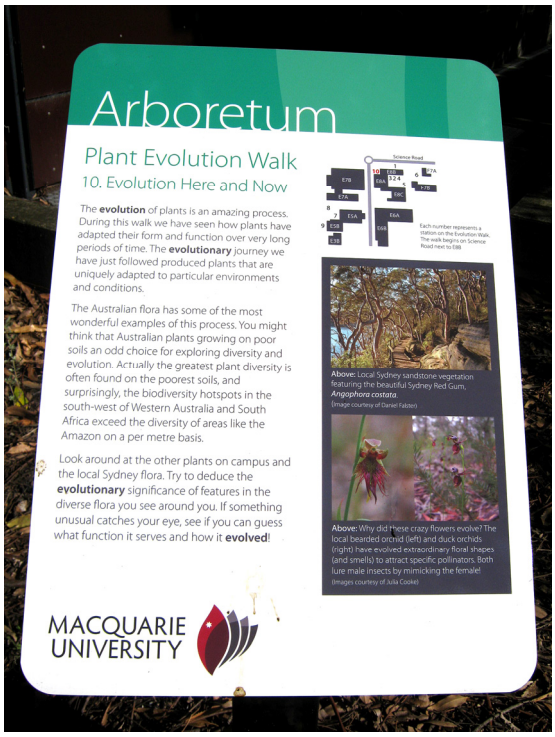

Fig. 1 - An example of Macquarie University arboretum signage. Photo: Andrew Simpson

Apart from the refurbishment of teaching spaces, other projects that have been supported at Macquarie University also provide significant leverage for reconceptualizing the biology museum including the university's arboretum. The university is located in an outer suburban zone of Sydney with a significant remnant of bushland. The university recently provided funding through its Sustainability Office for the development of an arboretum on campus. The Macquarie University Arboretum comprises all the trees and plants on campus. These trees, growing in natural and planted habitats, provide a valuable resource for teaching and research and a pleasing and relaxing environment for the enjoyment of staff, students and visitors to the university. The arboretum also provides habitat for many native birds and animals. There is a network of signage on campus and the development of established walks that focus on campus history and the evolution of plants. These walks are becoming increasingly popular with members of both the campus and general community. Simpson (2005) wrote about the value of campus surrounds in fostering natural history experiences as a way of generating interest in the environment.

Like the new external arboretum signage, it is proposed that didactic content for internal spaces would be aimed at school children, high school certificate students and undergraduates. Information would

be couched in 'jargon' free terms so anyone who might visit the museum would be able to understand the displays. Researchers will explain their research in an easy to understand and unencumbered fashion. An educational program will be provided so that schools can utilize this information as a supplement to classroom learning. The museum is also developing a website that will contain more content than the displays and hence engage with a variety of audiences with different levels of biological knowledge.

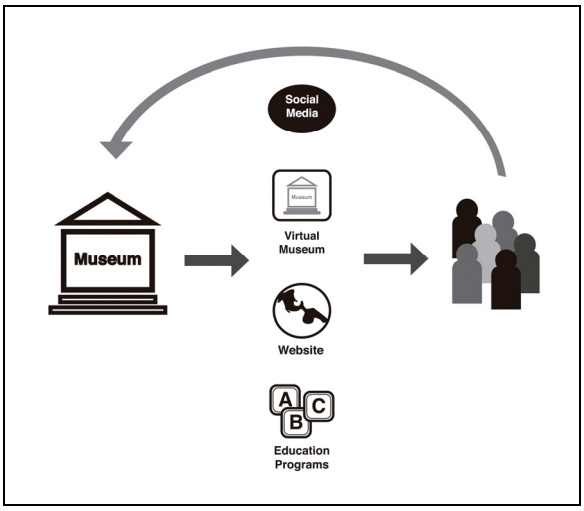

Fig. 2 - Conceptual diagram illustrating the relationships between the museum, the museum's digital presence and prospective audiences. Photo: Sara Estrada-Arevalo

It will provide a description of research being undertaken by academic staff, their recent papers, and the relevance of subject matter to the school curriculum. A virtual tour of the museum for students will be developed allowing access to extended information. Teacher's notes and links to other sites will also be accessible from the website. Having the website will allow those who cannot visit the museum in person to access the same information that those visiting are able, regardless of their level of understanding, thereby providing the same opportunities as walk in patrons, or those utilizing the teaching spaces.

The website will be for many, the first connection to Macquarie's new look Biological Sciences Museum. It is hoped that students from Australia and beyond will utilize the digital resources. Here, we return to the one problem that besets all museums in today's economic climate; money. BMAG has recognized that establishing virtual access through a variety of social media strategies is more cost effective than expensive changes to the content of physical exhibition furniture.

The museum needs to take it slowly in an effort to get it right from the start. A new museum logo has been designed and some of the new spaces have conceptually formulated, however, these will not become public before all stakeholders are engaged. Loss of interest from schools because information isn't what a teacher wants students to learn could seal the fate of the museum and funds that may have been available will not be forthcoming. So it is imperative that egos within BMAG are not too fragile, because of this bigger strategic picture. Making a success of this venture also requires that the community outside the museum becomes aware of the museum's existence. If schools like what they

Fig. 3 - Proposed new logo for the museum designed by Sara Estrada-Arevalo

Fig. 4 - Conceptual diagram of new exhibition designed by Sara Estrada-Arevalo

see, it is hoped that the museum's existence will be passed on by word of mouth, through teaching seminars and through the university's teaching of degree graduates.

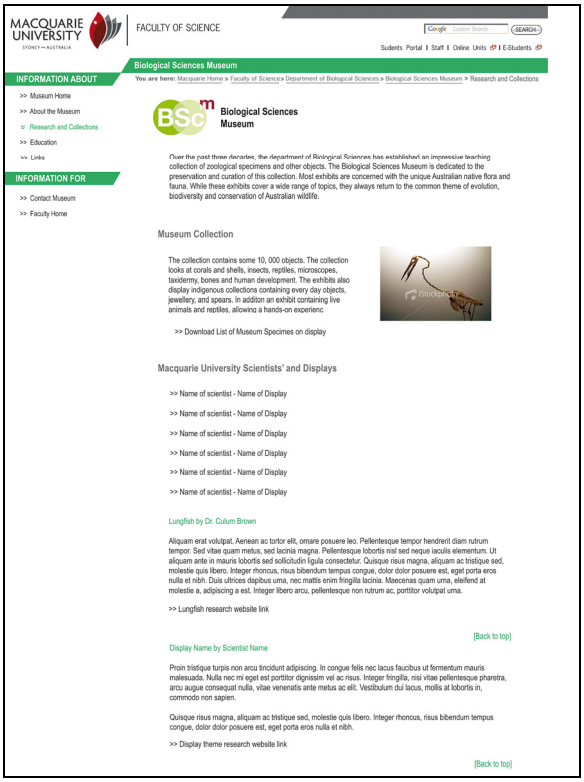

Fig. 5 - Proposed new web design for the museum. Photo: Sara Estrada-Arevalo

Conclusion

We propose that this process of reconceptualizing the museum involves essentially turning the museum inside out from being an inwardly focused unit that was disconnected from the processes of its host department and institution. It is seeking new engagement beyond its original walls by physically extending into the new teaching spaces, developing further lines of engagement through linking with other campus developments such as the arboretum, and extending its virtual presence through new media technologies to engage with a new diverse range of audiences with a primary focus of interesting the public in the urgency of issues around biodiversity and the role that a knowledge based organization can play in answering these new and critical challenges to human society.

We believe this model of reconceptualization can be undertaken by any campus-based museum seeking engagement and relevance with new and existing audiences.

Literature cited

ALBERCH, P. 1993. Museums, collections and biodiversity inventories. *TREE* 8 (10): 372.

BEATTIE, A. J. (ed.) 1995. *Australia's biodiversity living wealth, exploring Australia's plants, animals and micro-organisms*. Chatswood NSW: Reed Books.

COTTERILL, F. P. D. 1995. Systematics, biological knowledge and environmental conservation. *Biodiversity and Conservation* 4: 183–205.

GRIESEMER, J. R. 1990. Modelling in the museum: On the role of remnant models in the work of Joseph Grinnell. *Biology and Philosophy* 5: 3–36.

KRISHTALKA, L. & P. S. HUMPHREY 2000. Can Natural History Museums capture the future? *BioScience* 50 (7): 611.

PEARCE, M. & A. SIMPSON 2010. The exhibition of scientific principles: A case study from the Biological Sciences Museum at Macquarie University. *University Museums and Collections Journal* 3: 163–173, edoc.hu-berlin.de/umacj/2010/pearce-163/PDF/pearce.pdf (accessed November 3, 2011).

RAVEN, P. H. & E. O. WILSON 1992. *A Fifty Year Plan for Biodiversity Surveys*. *Science* 258: 1099-1100.

SIMPSON, A. 2005. University museums and formative experiences in natural history. In: *Proceedings of the Third Conference of the International Committee for University Museums and Collections (UMAC)*, ed. P. Tirrell (Norman OK: Sam Noble Oklahoma Museum of Natural History), 103–108, edoc.hu-berlin.de/umacj/2003/simpson-andrew-103/PDF/simpson.pdf (accessed November 3, 2011).

SOLINGER, J. W. 1990. Museums and Universities: Choices. In: *Museums and Universities: New paths for continuing education,* ed. J. W. SOLINGER. (London: Collier MacMillan Publishers), 2–3.

WINKER, K. 2004. Natural History Museums in a postbiodiversity era. *BioScience* 54 (5): 455–459.

Contact

Sara Estrada-Arevalo
Student, Museum Studies Program (Masters graduate)
Address: Macquarie University, Department of Environment and Geography, NSW 2109, Australia
E-mail: litasa(at)yahoo.com

Vicki Michael
Student, Museum Studies Program (Masters graduate)
Address: Macquarie University, Department of Environment and Geography, NSW 2109, Australia
E-mail: vicki.michael99(at)gmail.com

Andrew Simpson
Director, Museum Studies Program
Address: Macquarie University, Department of Environment and Geography, NSW 2109, Australia
E-mail: andrew.simpson(at)mq.edu.au